Story by Danielle Supercinski

Practicing Precision

Researchers demonstrate irrigation techniques on producers' farms

Wintergarden and High Plains researchers and county agents worked with 30 growers from various counties to conduct on-farm research demonstrations evaluating the extent to which limited irrigation practices may provide water savings and associated benefits.

These growers, Texas Agricultural Experiment Station researchers and Texas Cooperative Extension specialists and county agents have been working together since 2005 as part of the Precision Irrigators Network (PIN). The first stage of the PIN project was completed in September 2006, yielding preliminary water savings and establishing on-farm collaborations.

"Results from the first year of the study show tremendous possibility for water savings," said Dr. Giovanni Piccinni, PIN project leader and assistant professor of crop physiology with the Texas Agricultural Experiment Station at Uvalde. "While some growers are doing a very good job using limited irrigation strategies, others are overwatering their crops. These are the growers we want to target next year to improve their water-use efficiency."

PIN is educating agricultural producers about water conservation and irrigation management of various crops, including corn, cotton, grain sorghum, wheat and such winter vegetables as onions, spinach and other economically significant crops. The project's main tasks include: 1) evaluating limited irrigation on agronomic and vegetable crops, 2) evaluating the use of subsurface drip irrigation for forage production, 3) validating the High Plains Potential Evapotranspiration Network, and 4) developing and delivering educational programs.

A LEPA (Low Energy Precision Application) irrigation system is used on the PIN cotton field at the Texas A&M University System Agricultural Research and Extension Center at Uvalde along with lysimeters to evaluate crop water use and develop deficit irrigation management strategies.

This project was built upon ongoing success achieved through the North Plains Potential Evapotranspiration Network (NPET), which provides updated data agricultural producers can use to precisely apply the amount of water that meets crop needs, thus resulting in water conservation. In the past, translating new research discoveries into farming practices were often stalled because of the perception that research results do not conform to on-farm reality, Piccinni said. Therefore, PIN demonstration trials are carried out on producers' fields in the Wintergarden and High Plains regions, rather than on research centers, so producers can be involved in the research as well.

"We involve the growers in the research project by developing strategies specific for his/her farming system," Piccinni said. "By being involved firsthand in the research process, the growers are more likely to 'buy' into it and continue to apply newly developed strategies on his/her field, giving immediate adoption of research-proven practices.

"Furthermore, we envision that neighboring growers will be more likely to implement new management practices demonstrated on nearby farms rather than those shown only on small Experiment Station plots."

PIN strives to achieve these water savings through producer education, which results in the adoption of advanced technologies and conservation practices. Preliminary studies suggest that, based on 90,000 acres of irrigated land, widespread use of deficit irrigation practices have the potential to save up to 60,000 acre-feet or 19,530 million gallons of water annually in the Wintergarden region, and as much as 413,000 acre-feet of water each year in the Lower Rio Grande Valley (TWDB report 347, August 2001). In the High Plains region, the sum of the 12 producer fields totaled water savings (water pumped) of 16,715 acre-inches for the 1,900 acres of production monitored. The average water savings per corn producer was 8.7 inches per acre annually.

Studies conducted through this PIN project serve as a baseline for potential water savings and serve as a focus for Extension educational programs. A second and continuation PIN project began in September 2006, and researchers and county agents will continue working on-farm with agricultural producers to evaluate crop water needs and uses to further test irrigation methods to find the most water-efficient methods and amounts.

"We would like total participation of the Wintergarden and High Plains growers," Piccinni said. "By joining the Precision Irrigators Network, growers can achieve water savings resulting in increased profits. As always, when we talk about limited irrigation, the bottom line is we want to 'make every drop count.'"

PIN, as well as the continuation project, was funded by the Texas Water Development Board. Additional support was provided by the Rio Grande Basin Initiative through the Texas Water Resources Institute, Texas Agricultural Experiment Station, Texas Cooperative Extension, San Antonio Water Systems and Edwards Aquifer Authority.

Lysimeters are used in the cotton field to determine crop coefficients to use in combination with deficit irrigation methods.